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Chilton's
food Engineering

MORE THAN A CONTAINER

Today's food package long ago ceased to be just an envelope for its product. It is part of the entire marketing dimension of what's inside, and as such has very complex demands made on it.

WHAT'S COOKING

Customizing heat exchange systems.

PACK EXPO 86

A preview of this major show in November.

Chilton's Food Engineering

COVER STORY

This survey of *Food Engineering's* Executive Advisory Board reveals their opinions about current trends and factors that affect packaging buying patterns.

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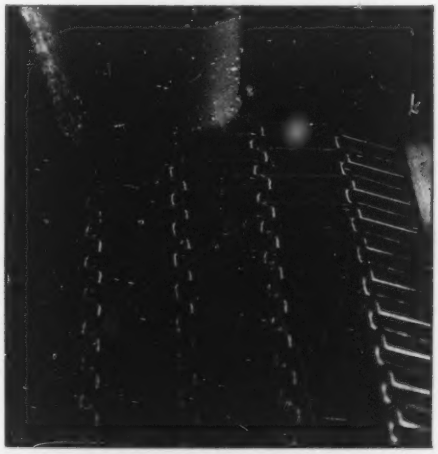

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Special Emphasis

COOKING & HEAT EXCHANGE:
This month's special coverage details how aseptic processing systems are being custom-engineered to product characteristics, using new ideas in heat exchange and total system design.

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Eating trends mean changes to food industry

Gordon McGovern of Campbell Soup likes to tell the story of dinnertime when he was a child. It was always at the same time—5:30 p.m.—and was always a sit-down meal with the entire family eating together and discussing what had gone on in their lives that day. McGovern also likes to compare that picture with his family today—he tells the tale of the constantly-revolving refrigerator door as his children eat on the run.

Eating trends have changed

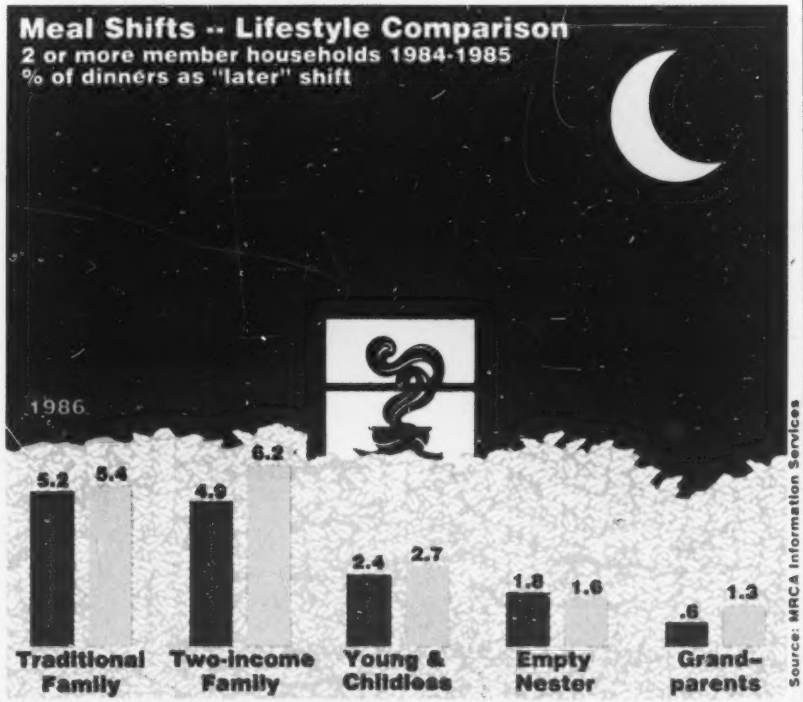
The picture set forth by McGovern of present-day family eating habits is all too commonplace across the U.S. A recent study by MRCA, the *Dinner Study*, surveyed 5,500 individuals from 2,000 representative households across the country. The study showed that when Americans are eating at home they are not necessarily dining together. Changes in lifestyles have wrought vast changes in eating habits. More and more households (10 percent more than seven years ago) are eating dinners in shifts rather than together. The home-cooked "family dinner" is like a black and white television—it's becoming a thing of the past.

Households with children are 50 percent more likely to have second or third shift meals than a household without children, says the study. Two income households are 15 percent more likely than traditional households (with one income, two parents) to serve second and third shift meals.

These second and third shift meals are being consumed mostly by people ranging in age from 18 to 34 years of age—and they are very often meals that have been reheated in the increasingly popular microwave oven. (The Commerce Dept. estimates that 51 percent of the U.S.'s 85 million households now have a microwave. The popularity of the microwave continues to grow.)

Who is eating what

The Dinner Study cites the following statistics:



Eating in shifts has become a growing U.S. phenomena. Households most likely to have second and third shift diners are those with children (twice as likely) or two-income households (15 percent more likely).

- 89 percent of first-shift diners eat the "main dish"; 82 percent of the second and third shift eaters will do so.
- Vegetables are eaten by 41 percent of first shifters, later shifters eat vegetables only 30 percent of the time.
- Dessert is eaten by 23 percent of first shift diners; by only 15 percent of second and third shift diners.
- For dessert, 1.9 billion *fewer* cakes and pies were eaten by Americans in the last seven years.
- Consumption of vegetables as a side dish fell 40 percent since 1978.
- Gains in beverages such as juices, fruit drinks, carbonated drinks and wine and beer were indicated while losses were tabulated in milk, coffee and tea.

Gains in dining out

"Going out to dinner used to be a rare treat for most Americans, but now it is just part of the weekly routine," says David Fencl, publisher of the Dinner Study. This sentiment is supported by the statistics. According to the National Restaurant Association's figures found in *The Foodservice Industry: 1984 in Review*, the percentage that consumers spent of their food dollars on meals and snacks outside of the home rose from 39.9 percent in 1983 to 40.5 percent for 1984 and traffic in restaurants was up by 4.0 percent over the same period.

According to an industry source, single people set the record for eating out, averaging 5.6 meals outside the home every two weeks. Households of two people eat out 4.4 times in two weeks; households with three members, 3.7 times and households with four or more people average 3.6 times.

It's all demographics

Affecting both trends—that of eating in shifts and the other of dining out—are the changes that continue to take place demographically. To the industry it means that foods are being packaged in smaller sizes to accommodate smaller households, foods that can be easily and quickly prepared (and microwaved) are becoming more popular and foods that appeal to older individuals who have specific nutritional and flavor needs are being developed.

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FOOD ENGINEERING'S EXECUTIVE ADVISORY PANEL

FE's Executive Advisory Board consists of 600 men and women representing a microcosm of the food and beverage industry. These managers and executives are helping us probe trends and buying practices throughout 1986. In this, the third report of the series, FE portrays the industry's views on food packaging materials and machinery through the eyes of our panelists.

TAPPING THE POTENTIAL OF PLASTICS

FE's survey results indicate a lot of interest in high barrier plastics and flexible packaging materials, along with potentially heavy equipment purchases

The results of *Food Engineering's Executive Advisory Board* packaging survey clearly indicate the dynamic state of packaging materials and equipment. New materials are constantly being tried. Packaging equipment is constantly changing. And new products with new packaging needs are constantly arising.

Are you looking for a high barrier plastic that works? You're not alone. The single item that stands out the most in *FE's* packaging survey is interest in improved high barrier plastics.

However, before you rush off to place an order, you should know that *FE's* Executive Advisory Board also listed several concerns about the new high barrier plastics, primarily price. When asked about their greatest concerns about multilayer barrier plastic packaging, 36.9% of the panelists said that the plastics are too expensive at this point. 30.7% are uncertain of true barrier protection when the package actually contains food. And, another 20.6% want to see more equipment designed especially for handling and filling these containers.

FOOD ENGINEERING

MARKET BATTLE FOR THE MARKET BASKET

With higher and higher product entry costs, it is more important than ever to know where the trends are and to effectively develop, launch, and support new efforts.

Once again, the food industry has broken its own record by introducing more new products in the past 12 months than in previous years. That's been happening for some time, and tends to prove that the new product development process works.

Unfortunately, even many people involved in it have little grasp of what it is and how it works from start to finish. For this year's "New Product Analysis," therefore, *Food Engineering* asked some highly successful new product innovators how they do it. Here's what they told us.

Kevin J. Hannigan – Features Editor
Ann E. Przybyla – Technical Editor

Genesis of a new product

In general, the new product process begins with a concept, followed by decisions on the attributes and benefits the new item should offer. Next comes a feasibility study to see if the product is cost effective, fol-

(Continued on page 54)

35.6% of the panel members considered packaging in barrier plastics to be of importance to their companies. When asked to describe a container or material they now need, but have been unable to find, many panelists said they wanted an inexpensive high barrier plastic container capable of withstanding high temperatures. Some examples of responses in this area included: "High barrier, *clear* plastic bottle that will withstand hot fill;" "high barrier plastic retortable containers which are stable at temperatures up to 300°F;" "a *clear* plastic jar which has a low MVTR and is a good oxygen barrier and can withstand mechanical rigors of packing and capping and is competitive in price with glass;" "a squeeze container with glass clarity, glass barrier properties and product compatibility able to withstand hot fill temperatures and cold temperatures during winter distribution... high impact resistance... able to be produced in wide-mouth and narrow-neck finishes...3-ounce to 1 gallon sizes."

Flexible packaging, too

30.4% of the panelists listed developments in flexible packaging as important. Packagers of confectionery products, flavors/food ingredients and bakery products led the way in this category. On panelists' wish lists in this area: "A 'foil'-like flexible packaging material with extremely good sealing/barrier characteristics at a cost of less than 1½ cents per impression;" "a flexible packaging material with oxygen barrier properties and that is biodegradable;" "a multi-latex film that will run at high speed on finseal equipment with lower sealing temperatures;" "a damage-resistant flexible film package of large capacity with easy open and reclosure feature to replace current multi-wall bags."

Also scoring high in importance to panel members were tamper-evident packaging (27.1%), dual-ovenable packaging (22.4%), aseptic packaging of low-acid particulate foods (19.6%) and controlled/modified atmosphere packaging (17.5%).

Other areas which may have scored low overall hold significant importance for different industry segments. The packaging of aseptic high-acid beverages ranked low overall (8.5%) but in the Beverage Industry, the category scored 23.3%. Similarly, "new technology in metal containers" scored 8.0% overall but 15.1% in the Canned Fruit/Vegetable/Entrees Industry and 12.1% in the Beverage Industry. "New developments in glass packages" also scored high in the Beverage Industry (18.2%), while scoring low overall (7.7%).

Purchasing new machinery?

Members of the advisory board named a broad range of packaging machinery that their operations are likely to purchase in the coming 12 months. At the top of the list is Coding and Imprinting machinery, with 50.3% of all operations intending to purchase some form of this equipment. 43.0% of our respondents listed Labeling Equipment as a prospective purchase. This was followed by Weight/Fill Controls with 39.4% and Cartoners with 36.6%. Significant percentages of panel members claimed imminent purchases of Horizontal Form/Fill/Seal Equipment, Vertical Form/Fill/Seal Equipment, Casing Machinery, Dry Product Filling Equipment, Bag-In-Box Systems, Palletizing Stretch Wrappers and Gas

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Tamper resistant features in which respondents are most interested

	TOTAL	MEAT PRODUCTS	BAKERY PRODUCTS	DAIRY PRODUCTS	FLAVORS/ FOOD INGREDS.	CANNED FRUIT/VEG /ENTREES	FATS AND OILS	FROZEN FRUIT/VEG /ENTREES	CONFEC- TIONERY PRODUCTS	CEREALS/ GRAIN PRODUCTS	BEVERAGES	OTHER FOOD PRODUCTS
Tamper-Evident Coatings	4.4%	7.2%	5.3%	5.2%	5.9%	4.1%	1.8%	7.8%	7.5%	4.9%	3.0%	5.2%
Break-Away Plastic	13.9	10.8	9.5	15.5	9.4	15.1	14.5	15.6	10.4	11.0	21.2	18.1
Labels, Film	19.6	22.5	23.2	17.2	18.8	13.7	27.3	14.1	23.9	19.5	18.1	17.2
Seals	20.9	15.3	25.3	22.4	22.4	20.5	29.1	21.9	23.9	24.4	18.2	25.9
Closure Linings	6.7	7.2	5.3	9.5	10.6	4.1	5.5	7.8	6.0	9.8	9.1	6.9

FOOD ENGINEERING'S
EXECUTIVE ADVISORY PANEL

Flush Systems.

We asked panel members to rank five factors in terms of their importance in making a packaging equipment decision. Topping the list is Speed/High Volume, which was ranked either first or second by more than half of the panelists. Pay-Back period was next, with a first place ranking of over 30%. These were followed in order by Low Maintenance, Changeover Capability and Reputation of Builder, which was a distant fifth. Breaking down the category even further, panelists from companies with 500 or more employees ranked Speed/High Volume even higher (60% ranking the category either first or second). Smaller companies (less than 100 employees) tended to place more emphasis on Low Maintenance and Pay-Back Period, as well as Speed/High Volume.

Another question asked of panelists concerned automation. We asked if all the microprocessors, computers and other electronic controls have produced benefits for their operations. About four out of five respondents say that automation *has* produced benefits. Of this group, over half (59.4%) place this gain in the 10% to 24% range. Of the negative respondents, 24.6% say that the automated equipment is not delivering on promised efficiency and 23.3% claim that the equipment is "too costly".

Respondents ranked several factors in terms of importance when making a packaging equipment division.

	Total	Administrative Mgmt.	Production Mgmt.	Engineering	Marketing/Sales
Low maintenance	2.88	2.88	2.83	2.81	2.60
Speed, high volume	2.53	2.69	2.47	2.48	3.00
Changeover capability	3.22	3.29	3.44	3.52	3.29
Reputation of builder	3.55	3.37	3.47	3.55	3.50
Payback period	2.79	2.69	2.75	2.59	2.56

Do sophisticated controls benefit the packaging operation?

YES		NO	
Total	79.4%		17.8%
How much better		Why not	
10% or less	14.3%	Too costly	23.2%
10-24%	59.4%	Not delivering on efficiency	24.6%
25-49%	21.1%	Too complicated for operators	18.8%
50-100%	3.6%	Need tie-in to central computer	14.5%

Tamper resistant packaging

Tampering is an issue that has received a great deal of recent attention. We asked panelists to tell us what types of tamper-resistant features they are considering adding to their packages. Of the 75.8% of the panelists who responded to the question, a fifth (20.9%) named simple Seals as type of tamper-resistant packaging in which they were most interested. An almost equal number (19.6%) cited Labels or Film and another large portion (13.9%) said Break-Away Plastic closures.

It is clear from the comments we've received that tamper-evident/tamper-resistant features are no longer a luxury on food packaging. They're expected to be an inherent part of any newly designed package. Panelists want "better tamper-proof features," "tamper-proof, recloseable packages (boxes and bowls) that don't require additional equipment to seal," "more tamper evident features (not yet seen) that are built in to lids, caps and other closures."

Purchasing foreign equipment?

The purchase of foreign equipment has been an issue for food packagers. Foreign equipment purchases have been attractive because of the high value of the American dollar, although there are very real concerns about parts availability. More than a third of our panelists (37.9%) said they were "very likely" to consider purchasing foreign equipment and 81.5% said they were at least somewhat likely to do so. Of those very likely to purchase foreign equipment, the primary reason given was that foreign packaging equipment is more innovative (39.5%). A substantial number (31.3%) said that foreign equipment is made better. 25.9% said that it is "more customized to my needs." Only a few (2.7%) said that foreign equipment is less expensive.

In commenting on the purchase of foreign equipment, one panelist said, "Foreign

equipment suppliers offer innovative ideas to gain a foothold in the American market, while American companies only offer 'me too' ideas when pressed. The drawbacks with most foreign machines are lead time and parts availability." One man believes that "the Federal agencies (FDA, USDA, etc.) 'scare off' U.S. packaging companies from being too different." Another purchaser says, "I'll buy from anybody who gives me the best price, best service and most maintenance backup for the machine which suits my needs and performs reliably." Another panelist claims, "Foreign suppliers are on the leading edge of packaging technology, while American suppliers seem unwilling to invest the time and money into research and development."

Whether or not to use contract packers is another question facing food processors. Contract packaging allows processors to try different types of packages or to expand volume beyond their own capabilities or to try

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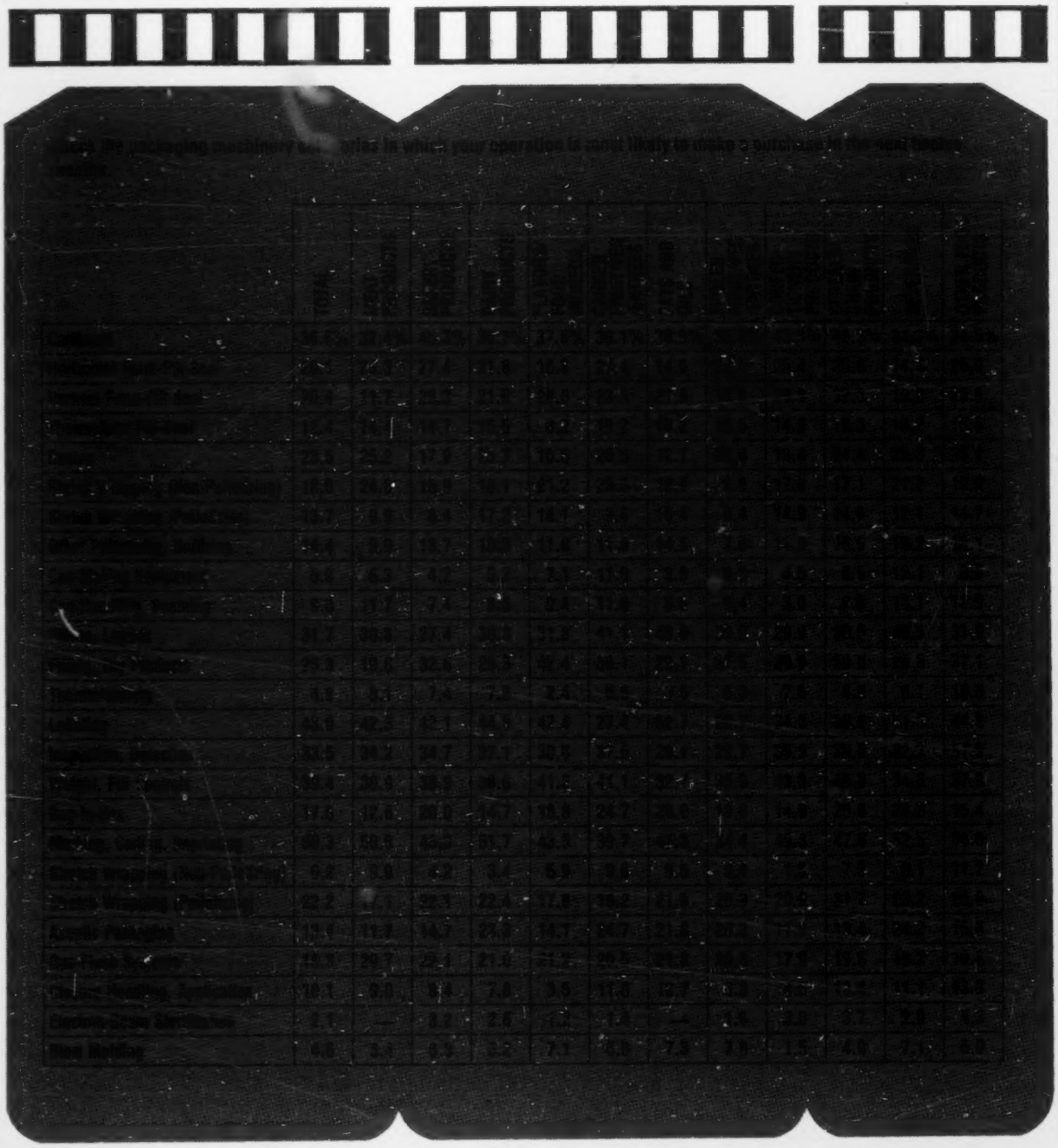

market tests on new products without disrupting production or to make smaller batches that would be inefficient on their own lines. Slightly more than half (50.5%) of our panel members said they were encouraged to either begin using or increase their use of contract packagers. Use of contract packers is particularly high among members who are involved with Canned Fruits, Vegetables and Entrees (75.3%) and Cereals/Grain Products (73.2%). A quarter of the panelists said their use of contract packaging would increase by 10% to 24% over the next five years.

Panel members interested in dual-ovenable packaging were asked to choose the material or container that will best fill their needs for this type of packaging. Their responses indicate an overwhelming preference for two types of materials. One third (33.3%) of the members responding chose Crystallized Polyester (CPET), while over a quarter (26.9%) chose PET-Coated Paperboard. PET-Laminated Paperboard, Other Plastics, Aluminum, Pressure-Formed Plastic and Thermoset PET claimed small percentages of those surveyed.

Packaging wish list

We asked our panel members to describe containers or materials they now need, but have been unable to find. We hoped that this kind of information could encourage suppliers to do some development work in these areas. We have asked this question before in other surveys and as always, we have gotten some interesting responses:

"It would be nice to have a packaging system made from aluminum that could be 'safely' microwavable. This packaging system could serve as a package-serve-cook all-in-one system."

"A barrier bag which is impermeable to oxygen, but will allow carbon dioxide and hydrogen gas out."

"We would like a replacement for our #10 can that is sturdy, lightweight, inexpensive, retortable and made of safe materials."

"We need a high speed packer with the capability of thermoforming a variety of sizes that can provide an aseptic container without chemical sterilization. This packaging machine should allow for microwavable container material and allow for fill adjustment on the run."

"A thermoformable, semi-rigid, clear material for both the body and lidstock with at least as good barrier properties – moisture and oxygen – as the co-extruded laminates used in squeezable bottles."

As you can see from our survey results, plastics are very much on the minds of packaging executives. They see packaging possibilities with the high barrier and high heat-resistant plastic materials. And they want these possibilities to become reality.

Over the next five years, how much will the use of contract packaging increase?

	Total	Administrative Mgmt.	Production Mgmt.	Engineering	Marketing/Sales
Less than 10%	15.7%	14.2%	15.1%	14.5%	13.5%
10%-24%	25.0	22.0	11.6	24.5	10.8
25%-49%	7.2	5.5	4.7	5.5	8.1
50%-100%	2.6	3.1	1.2	0.9	5.4
No answer	49.5	55.1	67.4	54.5	62.2